daughters appear from the sides of larger parent ("apical") polyps, was described as centrifugal, while that in *Anacropora*, in which an apex of undifferentiated cœnenchyma takes the lead and the young polyps appear in it as it grows, was called centripetal. The distinction was thought to be fundamental. On the other hand, the new genus came very near *Montipora*, differing from it chiefly in the fact that the calicles in *Montipora* are typically immersed, while in *Anacropora* they bulge up the surfaces of the branches into mounds or eminences.

The new genus was accepted at once by Duncan in his revision of Milne-Edwards and Haime's system, and he allied it with *Montipora*.

The 'Challenger' expedition brought home two new types, which Quelch classed under Ridley's genus, and in 1892 Rehberg * added another specimen and type, bringing the number up to four. The following notes are based upon the study of the specimens and fragments (twenty-two in all) in the National Collection. These include all the existing types except that of Rehberg (*A. spinosa*), which is in the Hamburg Museum. The examination has resulted in the establishment of two new types, one being represented only by fragments, the bulk of the specimens being in the Vienna Museum. Full details will appear in the official catalogue, which is in the press.

I was for some time quite uncertain as to the validity of the distinction made by Ridley between *Anacropora* and *Montipora*. Slight mounds or elevations on which the calicles opened might and do, indeed, occur in *Montipora*, wherever the corallum is very thin, while, on the other hand, we have in *Anacropora* the streaming axial layer leading the growth, and forming, as in *Montipora*, the tips of branches, and a further cortical layer formed just as in *Montipora*. It seemed to me, therefore, that while the fundamental identity in the structure of the colonial skeleton showed that *Anacroporæ* were really Montipores, the presence of protuberant calicles, which might be a slight return to primitive conditions, hardly justified the establishing of a new genus. Comparison with other types and with the undescribed material in the collection has, however, revealed other characters which are important enough to warrant our retaining the genus, but uniting it with *Montipora* under a subfamily Montiporinæ.

While, then, the fundamental identity in the structure of the cœnenchyma shows that *Anacropora* has branched off

* Abh. Nat. Ver. Hamb. xii. p. 46.

from *Montipora*, we may assume that the protuberant calicles, which may, in some cases, be even tall and conical, suggest that this branching off took place at a very early stage in the development of that genus. That these protuberances are primitive, and not secondary returns to primitive conditions, may, perhaps, be gathered from the very important fact that the primary septa in the more protuberant calicles are laminate, and, further, that these laminate radial structures may even project down the outer wall of the protuberance as costal ridges (Pl. II. fig. 5). It is specially worthy of note that the less protuberant calicles, or those which open flush with the surface, have the degenerated septal apparatus characteristic of *Montipora*, while those which grow taller and slightly larger develop radial skeletal laminæ, septa and costæ. While it is of course quite possible that this is a secondary return to primitive conditions, there is no reason why we should not assume it to be the persistence of such conditions. The burden of proof, I think, rests with those who prefer the former suggestion.

I have been much struck by noting that many of the protuberant calicles with costal ridges running down their sides show the tendency to a spiral twisting of the whole calicle which I have already referred to in *Turbinaria* and *Madrepora*. This fact, again, seems to me to suggest that the protuberance of the calicles is primitive and not atavistic.

Hence, then, we conclude that *Anacropora* branched off from *Montipora* before the degeneration of the calicles and of their laminate radial skeleton had gone as far as it now has in the latter genus.

In this connexion it is worth noting that the axial streaming layer is typically laminate or band-like, and that, in those cases in which it appears most filamentous, examination shows that this is a secondary condition due to the formation of large perforations in the primitive longitudinal bands. This band-reticulum, as we have seen above, can be best traced to the outward streaming of the primitive laminate radial structures composing the chief portion of the thick walls of the parent and daughter polyps in the earlier stages of colony formation.

In addition to this important laminate structure of the walls of the more protuberant calicles, the method of branching is quite peculiar. All the known types are composed of rather thin cylindrical stems more or less knotted (by the protuberant calicles) like a thorn-stick. While the stems are generally slightly curved, the branches come off suddenly at rather wide angles, the stem at the same time bending

away from the branch. It is, in reality, a kind of forking, only the stem remains the more important and less diverging prong. The result of repeated branchings with free fusions between parts that touch is to form a rather closely matted tangle low down near the ground, the meshes in the tangle being more or less angular. This angular character of the meshes is, however, frequently obscured by curvings of the branches. Broken fragments falling down into the tangle freely fuse on again, and help to make the net thicker. In claiming this very peculiar method of growth as characteristic of the genus I am aware that it is not immediately evident in all the types. It is very marked in Ridley's original type (*A. Forbesi*), in Quelch's types (*A. gracilis* and *A. solida*), and in one of the new types (*A. echinulata* *), whereas it is not so marked though traceable in *A. erecta* *, and apparently least visible in Rehberg's type (*A. spinosa*). In these last two forms the branching does not come off at such a wide angle, and hence the whole corallum is more symmetrically arborescent. But in *A. erecta*, so far as I remember the photographs shown me by Dr. Marenzeller, the larger clumps were very close tangles of thin knotted stems, and Rehberg's figure of *A. spinosa* (*l. c.*) appears to show distinct traces of a tendency to sudden angular bendings of the stems and branches.

These points, then, the protuberant calicles, showing distinct lamination of their radial structures, and the peculiar character of the branching, serve, I think, to separate *Anacropora* from *Montipora*, with which genus it is, however, fundamentally associated in the structure of the cœnenchyma and in the presence of calicles with degenerate septal apparatus exactly like those of *Montipora*.

Interrelationships of the Madreporidæ.

As we have above seen, the only argument for allying *Montipora* with *Porites*, as was done by Milne-Edwards and Haime, and later by Duncan, falls to the ground as soon as the secondary character of the trabeculæ is established †. Hence we have no hesitation in claiming the genus with its ally *Anacropora* as together forming a subfamily of the Madreporidæ. I shall now endeavour to show that the remaining three accepted genera—*Madrepora*, *Turbinaria*,

* Full descriptions of these are given in the Museum Catalogue.

† In 1889 Dr. Ortmann suggested, without going into details, that *Montipora* might be deduced from *Porites* through *Alveopora* (Zool. Jahrb. (syst.) iv. p. 584).